

Forging America's Energy Future

The Vital Role of
Nuclear Energy



An Environmentally Responsible Energy Future

A Vision for Nuclear Energy in 2020



The U.S. Department of Energy projects the need for about 50 percent more electricity in the United States by 2020. Affordable energy is the foundation for economic growth and the quality of life for all Americans. And affordable energy must be produced in an environmentally sound manner.

The nation currently gets 30 percent of its electricity from sources that produce no air pollution. These sources—which include nuclear energy, hydropower and renewables—emit no sulfur dioxide, nitrogen oxides or carbon dioxide.

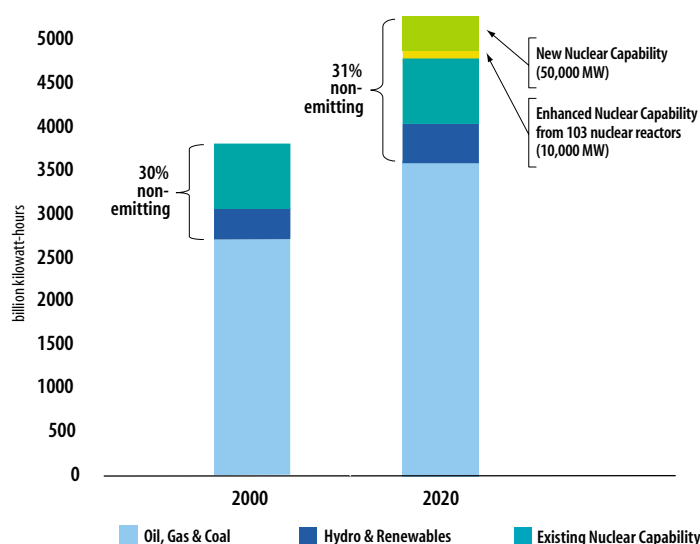
The nuclear energy industry plans to add enough nuclear-generated electricity capacity by the year 2020 to help meet growing demand for power economically and reliably, while at the same time helping to meet U.S. environmental goals.

The plan entails two steps:

- ▶ add 50,000 megawatts* of new nuclear capacity to the electricity marketplace
- ▶ achieve a 10 percent increase in production at current nuclear reactors—the equivalent of boosting the nation's nuclear capacity by another 10,000 megawatts.

* One megawatt equals 1,000,000 watts, or enough electricity to power 1,000 homes.

Preserving Our Emission-Free Electricity Portfolio





U.S. Energy Policy

Generating Reliable Electricity for the Future

Policymakers, business leaders and consumers recognize the need for a comprehensive energy policy for the United States. Conservation and energy efficiency are necessary, but in themselves not sufficient to meet our growing electricity demand. That policy must provide a balanced, diverse range of generation sources for electricity, which is critical to economic growth and our standard of living.

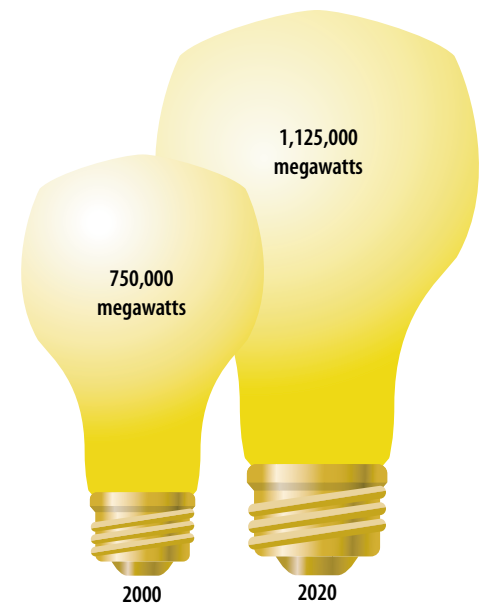
If energy production trends of the 1990s continue, the country cannot meet the electricity demands of the new century. With few new power plants built over the past decade, America's economic growth has been powered by electricity from plants built during the 1970s and 1980s.

However, this approach cannot continue to support a growing, energy-intensive digital economy.

According to the U.S. Department of Energy, we will need almost 400,000 megawatts of new electricity production by 2020—about one-half of our electricity capacity today. This assumes that the need for electricity will grow by 1.8 percent a year—a modest rate, considering the 2.2 percent annual growth rate between 1990 and 1999.

At this modest growth rate, the United States would need as many as 20 new large-scale power plants—each in the 1,000 megawatt range—every year over the next 20 years.

50% More Electricity Needed by 2020



Source: U.S. Department of Energy

The Policy Challenge

America's energy policy challenge is to meet the growing demand for reliable electricity while protecting our environment. According to recommendations by the United States Energy Association, this policy should encourage:

- ▶ fair market treatment of all energy resources, recognizing that no single energy source can meet the country's needs
- ▶ U.S. global leadership in energy development, services and technology
- ▶ investment in energy technology research and development, focusing on energy sources that can realistically meet future needs
- ▶ advancements in proven, environmentally friendly energy sources
- ▶ regulatory predictability to stabilize investment decisions
- ▶ enhanced competition as the electricity marketplace restructures, to encourage flexible investment approaches to new electricity generation and transmission.

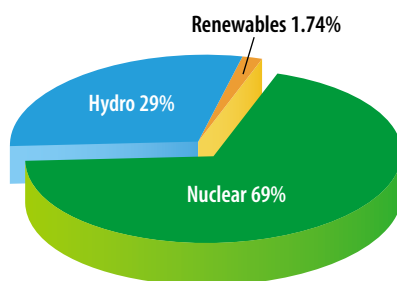
Nuclear Energy: Proven Safe and Prepared To Meet Our Energy Challenges

Nuclear energy will help meet the demand for new, environmentally sound power. Nuclear energy is the nation's second largest source of electricity behind coal, serving one of every five homes and businesses. Importantly, nuclear energy accounts for nearly 70 percent of all U.S. emission-free electric generation.

In the U.S. Department of Energy's voluntary emissions reduction program, nuclear power plants are responsible for the largest reduction of carbon. This clean air value will increase as Clean Air Act requirements limit our ability to find sites for new fossil-fueled power plants and increase the cost of electricity production from these sources.

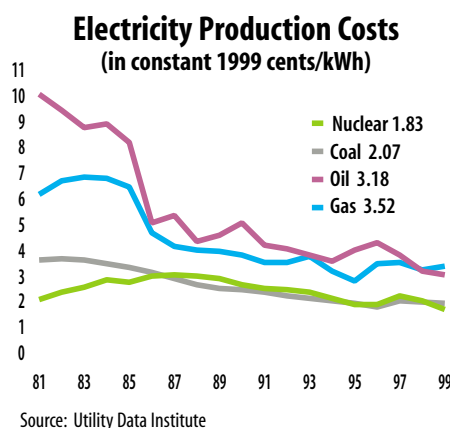
America's 103 power reactors provide reliable electricity at stable, low prices in an increasingly volatile electricity marketplace. Unlike other fuel sources, such as natural gas, nuclear energy is not subject to dramatic fuel price swings.

Sources of Emission-Free Electricity



According to the Utility Data Institute, nuclear production costs in 1999 averaged 1.83 cents per kilowatt-hour, lower than coal at 2.07 cents per kilowatt-hour, oil at 3.18 cents per kilowatt-hour and natural gas at 3.52 cents per kilowatt-hour.

In fact, analysts believe that most nuclear plants easily will be competitive at market-clearing prices for electricity, expected to be between 2.5 cents and 3.5 cents per kilowatt-hour.



The United States continues to play a global leadership role in developing safe nuclear technology, regulatory standards and efficient plant operations.

In fact, America's nuclear plants produced a record 754 billion kilowatt-hours of electricity in 2000, more than nuclear energy in Japan and France combined.

The safety record of U.S. nuclear power plants is unparalleled in American industry. The industry average for unplanned reactor shutdowns in 2000 was essentially zero for the third straight year. Also, the lost-time accident rate for workers at the nation's nuclear plants was 0.26 per 200,000 worker-hours in 2000. By comparison, the 1999 rate for the U.S. manufacturing sector was 8.1.

Since 1990, nuclear power plants have become increasingly efficient. The additional electricity output from nuclear power plants during the

1990s is the equivalent of adding 22 new 1,000-megawatt plants to the country's electrical system.

The value of today's power reactors is underscored by the fact that energy companies are pursuing the renewal of nuclear plant licenses. Companies will add 20 years to their original 40-year licenses if the U.S. Nuclear Regulatory Commission (NRC) certifies that the plants can meet federal safety standards for the additional term. One-third of U.S. power reactors are scheduled for license renewal review by the NRC through 2005; virtually all are expected to follow.

Safe used nuclear fuel management is important for laying the groundwork for nuclear energy's future. Used nuclear fuel is stored safely at nuclear power plant sites across the nation awaiting consolidation at a federal government disposal facility. The Energy Department has conducted extensive scientific studies at the repository site at Yucca Mountain, Nev., as a basis for deciding whether to construct a facility there.

Nuclear energy's proven record of safety and performance, its value to the electricity system and our environment, and the stable prices it offers for the future underscore the critical need to expand its role.

The Business Strategy for New Nuclear Energy Plants

There is a new business approach underpinning decisions to build nuclear power plants. Because of the transition to competitive electricity markets, electric companies in many states no longer can expect to recover capital investments in new plants through regulated electric rates. Many companies must build future power plants that are competitive in an open market.

U.S. energy companies and the Nuclear Energy Institute have pooled expertise to develop plans for building new nuclear plants. The plans have the following areas of focus:

■ Energy companies are exploring new ways of financing, building and operating nuclear power plants in a competitive market.

This area of focus concentrates on:

- ▶ reducing engineering, procurement and construction costs
- ▶ applying new approaches to plant ownership, capital recovery and reducing business risks
- ▶ achieving policy changes needed for fair market treatment of all energy sources, including new nuclear plants.

■ Achieving a predictable licensing process.

This area concentrates on confirming the U.S. Nuclear Regulatory Commission's (NRC) new licensing processes for nuclear plants. It calls for:

- ▶ supporting new applications for advanced reactor designs and new nuclear plant licensing



- ▶ setting in place a proven process for early site permits for nuclear plants
- ▶ ensuring an efficient process for issuing combined construction and operating licenses and for verifying that a plant is ready to operate when construction is complete
- ▶ establishing a regulatory framework for future nuclear plant licensing that builds on the NRC's new reactor oversight process.

■ Maintaining the national "infrastructure" needed for new nuclear plants. Supporting new nuclear power plant construction and operation—in addition to the operation of today's nuclear plants for decades to come—

requires a vigorous workforce, service organizations and suppliers. The plan focuses on:

- ▶ cultivating the next generation of engineering professionals and skilled trades personnel to build and operate nuclear plants
- ▶ maintaining—and expanding where needed—the industries that support new nuclear plants: manufacturers, engineering services, construction companies, equipment suppliers and others.

The Framework for Tomorrow's Plants

The nuclear energy industry is continually preparing for the future. It continues to reach higher levels of efficiency and production from today's plants. And it has laid the groundwork for building new nuclear power plants.

Like other high-tech industries, nuclear energy technology has advanced with experience. For more than four decades, the nuclear energy industry has been improving the safety and efficiency of power reactor technology.

American public support for nuclear energy also has grown steadily. A July 2001 survey revealed that 74 percent of U.S. adults agreed, "We should keep the option to build more nuclear energy plants in the future." Sixty-three percent supported building new nuclear plants, according to a Bisconti Research/Bruskin Research survey.

In addition, the industry is standardizing plant construction based on new reactor designs certified by the U.S. Nuclear Regulatory Commission (NRC). Reactors producing electricity today are virtually one-of-a-kind power plants, and they were built in a period of rapidly evolving regulatory requirements and licensing standards.



But for future reactors, the industry has concentrated on standardized designs for both light water reactor technologies and for other emerging technologies including gas-cooled reactors.

Standard Reactor Designs

Standardized reactor designs certified by the NRC include the Westinghouse AP600 and System 80+ designs, and the General Electric Advanced Boiling Water Reactor. These designs incorporate new technology and advanced safety features.

With standardization, nuclear plants will be built in "families" of the same reactor design. This approach is expected to reduce construction and operating costs, result in greater efficiencies and achieve even higher levels of safety.

Safety Issues Resolved Early

Through the NRC's advanced design certification process, safety issues are resolved before plant

construction begins, since public hearings are held early in the licensing process. Design details are resolved prior to construction, eliminating design changes during the construction process.

Companies also may apply for a site permit for a new plant well in advance of a decision to build a nuclear power plant. This assures that questions about site suitability are resolved before plant construction begins—with a public hearing held early in the process.

This new licensing approach allows for more timely and meaningful public participation. The new process will be more open to the public, predictable and efficient. The result is that energy companies can pursue with greater certainty long-range plans for new nuclear plants to meet future electricity demand.

Fostering the beneficial uses of nuclear technologies around the globe.



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